United States Department of the Interior

FISH AND WILDLIFE SERVICE
10711 Burnet Road, Suite 200
Austin, Texas 78758
512 490-0057
FAX 490-0974

September 22, 2004

Salvador Deocampo
District Engineer
Federal Highway Administration
J.J. Pickle Federal Building
300 East 8th Street, Room 826
Austin, Texas 78701

Consultation No. 2-15-F-2003-0010

Dear Mr. Deocampo:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (opinion) based on our review of the proposed construction of the U.S. Highway 79 relief route in Milam County, Texas (CSJ: 0204-06-041), and its effects on the federally listed endangered Navasota ladies'-tresses (*Spiranthes parksii*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your April 8, 2004, request for formal consultation was received on April 12, 2004.

This biological opinion is based on information provided in the March 19, 2004, Biological Assessment (BA), and the May 2002 draft environmental assessment (EA), both prepared by the Bryan District of the Texas Department of Transportation (TxDOT). This Opinion is also based on telephone conversations, e-mail correspondence, and meetings with staff from TxDOT, the Federal Highway Administration (FHwA), and the Service. A complete administrative record of this consultation is on file at this office.

Consultation History

The May 2002 draft EA was received in our office on September 25, 2002. In the October 10, 2002, response to Paul Turner of TxDOT, the Service concurred with the determination that the proposed project would not affect the bald eagle (*Haliaeetus leucocephalus*), least tern (*Sterna antillarum*), whooping crane (*Grus americana*), or piping plover (*Charadrius melodus*). We also agreed that it was unlikely the Houston toad (*Bufo houstonensis*) occurs in the project area. We requested additional information on potential impacts to the Navasota ladies'-tresses.

In a March 28, 2003, letter, TxDOT transmitted a revised EA to the Service, which included the results of a November and December 2002 Navasota ladies'-tresses survey and habitat assessment.

On April 24, 2003, FHwA, TxDOT, and the Service met to discuss the proposed project and a possible programmatic consultation on TxDOT projects' impacts to Navasota ladies'-tresses in the Bryan District.

In a May 23, 2003 telephone conversation, Karen Clary and Paul Turner of TxDOT and the Service discussed the draft EA. Specifically, TxDOT was attempting to determine which effects determination would be most appropriate for this project, how to delineate habitat, and offset project effects, with voluntary conservation measures.

FHwA requested initiation of formal section 7 consultation by letter dated April 8, 2004. The initiation package included the March 19, 2004, BA which concluded that the Navasota ladies'-tresses could be adversely affected by destruction or modification of habitat that may occur, although no individuals of the species were found in surveys performed in October-December 2002 and 2003. A revised EA dated April 7, 2004, was also received which determined the project was likely to adversely affect Navasota ladies'-tresses. The Service concurred with initiation of formal consultation in a May 12, 2004, letter to FHwA.

BIOLOGICAL OPINION

Description of Proposed Action

TxDOT proposes constructing a new 8.3 mile (13.4 kilometer) long, four-lane U.S. 79 relief route around the city of Rockdale using Category 3A – National Highway System Mobility funds allocated by FHwA. U.S. 79 is currently the only major east-west arterial route from the Texas/Louisiana border to Austin. This route is designated as a Texas Trunk System Phase II corridor by the Texas Transportation Commission that will provide a four-lane, divided highway from the Louisiana border to Austin. The majority of traffic that will use the relief route will be highway travelers that currently use the existing U.S. 79 route.

The proposed route lies north of, and around, Rockdale (Figure 1). The new highway will be constructed from 2.7 miles (4.3 kilometers) east of the city of Rockdale to 1.8 miles (2.9 kilometers) west of Rockdale. An intersection separated by grade (elevation) will be constructed at each terminus. Additionally, three more grade separations will be built at the intersections with U.S. 77, Farm-to-Market (F.M.) 908, and F.M. 487. The roadway will be composed of four 12-foot (4-meter) lanes, two 10-foot (3-meter) outside shoulders, two 4-foot (1-meter) inside shoulders, a 76-foot (23-meter) grass median, and a right-of-way (ROW) varying from 250 feet (76 meters) to 500 feet (152 meters) wide. The average roadway width is 44 feet (13 meters) with a 100-foot (30-meter) ROW. Approximately 600 acres (243 hectares) of new ROW will be acquired for the project. Approximately 30 acres (12 hectares) will be designated as the "clear zone", a required cleared area spanning from the edge of the travel lane to 30 feet (9 meters) outside of the lane. This zone is designed to eliminate objects that may pose obstruction hazards to passing motorists.

The proposed construction will result in adjustments to existing electric utility lines, including moving poles. In addition, oil and gas pipelines and an Aluminum Company of America water pipeline will be lowered and encased to prevent rupturing during construction activities.

Five acres (two hectares) of woodlands outside of the clear zone for construction will be avoided and protected from damage from construction activities with temporary fencing. Avoidance of most of the habitat in the direct path of the new construction is not possible on this project because these habitats are located on both sides of the existing roadway. Navasota ladies'-tresses habitat that may occur within the ROW will become part of the new road and/or the required clear zone adjacent to the roadway. Nevertheless, TxDOT proposes to preserve as much habitat outside the roadway clear zone as possible, particularly those areas from the back slope of the roadside ditch to the edge of the ROW. Proposed avoidance measures include retaining as much woody cover and natural topography as possible in areas of Navasota ladies'-tresses habitat. In addition, revegetation of disturbed areas will be done with native tree and shrub species where feasible and allowed by project plans.

Cleared areas outside of the new alignment will be replanted with native tree species wherever feasible following construction, including in five areas near the two project termini and three grade separations. These five areas contain a greater area available for landscaping due to the widened ROW at these sites. TxDOT asserts that the cutting of highway back slopes (the area from the center of the ditch line to the right-of-way line) through Navasota ladies'-tresses habitat would create areas with the drainage/seepage factors potentially conducive to Navasota ladies'-tresses habitation. TxDOT would monitor these areas before and after construction and if plants are found in these areas in the future, would protect them from disturbance by the placement of barriers and/or protective signing and by monitoring on a regular basis.

Twelve intermittent streams cross the project alignment. Most streams are anticipated to receive box culverts, with vegetation removal using chainsaw and/or scraping with a backhoe, and channel shaping above and below the ordinary high water mark (OHWM) for the placement of the culvert. Any crossings spanned by bridges will involve minimal vegetation removal to allow for the placement of the bridge abutments. Impacts to streambed vegetation downstream of the crossings are expected to be minimal, because the alterations to streambed habitat below the OHWM due to construction are minor.

TxDOT proposes to compensate for impacts to 11.3 acres (4.6 hectares) of riparian woodlands and 14.7 acres (5.9 hectares) of mature post oak woodlands through an in-lieu fee mitigation in coordination with Texas Parks and Wildlife Department. In a proactive effort to comply with section 7(a)(1) of the Act, TxDOT also proposes to provide voluntary compensation for impacts to Navasota ladies'-tresses through monetary contribution to a conservation fund set up to benefit this species. This money would be used to fund habitat preservation/conservation in perpetuity through land acquisition for preserves, conservation easements, or other binding agreements for Navasota ladies'-tresses. The amount to be contributed will be calculated using a formula based on fee simple land acquisition costs. TxDOT will multiply the final number of acres impacted by the average value per acre and add an additional amount (not to exceed 15 percent) to cover indirect costs of land acquisition. Indirect costs to be covered are limited to those directly related to habitat preservation/conservation such as appraisals, legal fees, landowner contact expenses, and the expense of preserve design. To calculate land values, TxDOT will use an average assessed value per acre for undeveloped tracts similar in size to the

acreage required for mitigation. TxDOT will obtain the assessed values from the county appraisal districts for Milam County just prior to the year the contribution is to be calculated and paid.

TxDOT proposes providing compensation for losses of optimal Navasota ladies'-tresses habitat that may occur onsite by contributing money sufficient to replace one acre of optimal habitat destroyed with one acre of known habitat. Each acre of marginal habitat that may occur onsite would be replaced with 0.5 acre of known habitat. An additional 20 percent would be added to the total acreage figure to account for edge effects. Thus, TxDOT proposes to provide compensation for a total of 67.86 acres (27.46 hectares) of Navasota ladies'-tresses habitat: [(9.57 acres optimal habitat + ½ (93.96 acres marginal habitat)) + 20 percent]. This figure may be modified slightly prior to construction if revisions in the final plans result in an increased or decreased area of impact but should not vary by more than 20 percent of the current amount.

The areas from the center ditch line to the ROW line within the areas delineated as habitat will be monitored by district personnel familiar with Navasota ladies'-tresses for at least five years beginning the year construction is started. In addition, the ROW will be monitored a minimum of five years beginning with the first year the conditions are appropriate to conduct surveys for Navasota ladies'-tresses, such as when the plants are blooming in known habitat nearby. This may or may not be the first year following construction initiation. If this species is discovered in the ROW, the Service will be contacted to discuss additional avoidance and minimization measures that may be possible.

Species Description and Status

Description:

The Navasota ladies'-tresses, a woodland orchid known from 11 counties in central Texas, was federally listed as endangered on May 6, l982 (47 FR 19539), without critical habitat. This orchid is an erect, slender-stemmed perennial that grows 8-15 inches (20-38 centimeters) tall. The roots are composed of fleshy tubers, which extend approximately 3-5 inches (8-13 centimeters) below the surface. The linear leaves form a rosette, but are absent at the time of flowering. White flowers are arranged spirally on the stalk and have white-tipped floral bracts (leaf-like structures) at the base of each flower. Flowers are about 0.25 inch (0.64 centimeters) long with rounded petals. Side petals have a distinct green stripe and extend past the central petals. The lower central petal is ragged. Basal rosettes appear in the spring, and buds appear in early to late October. Flowering usually occurs from mid-October to mid-November depending on local environmental conditions. Flowering ends usually around the time of the first frost in November.

Life history:

Navasota ladies'-tresses occur in a variety of perennially moist sandy or loamy soils near drainages, typically from the upper erodible drainage head, extending along the edges of

temporary streams to the floodplain of permanent streams. Known habitat consists of natural canopy openings in upland post oak (*Quercus stellata*) savanna vegetation (Poole and Riskind l987, Service 1984, Wilson l993). Plants are believed to be situated where subsurface flow or seepage of water occurs seasonally, a common feature in other species of the genus (Arft and Ranker 1995, Kathy Parker, Tejas Environmental Services, pers. comm.). It is known that the occurrence of impermeable claypans beneath the sandy or loamy soils in this area makes these subsurface areas resistant to water percolation, and hence, water tends to travel laterally along these subsurface features toward the dissected drainages typical of the area, providing a relatively dependable moisture source for the orchids. This hydrologic feature, as well as edaphic factors such as high aluminum soil content, can limit competing vegetation (TPCC 2003).

While the Navasota ladies'-tresses occur in small naturally-created openings in the post oak woodlands, it cannot be regarded as a disturbance species, as it usually occurs in well-developed woodlands and does not colonize extensively disturbed areas. It is rarely found in floodplain forests or open, drier areas dominated by grasses (Wilson 1993). Associated species include blackjack oak (*Quercus marilandica),* yaupon holly (*Ilex vomitoria*), American beautyberry (*Callicarpa americana*), and little bluestem (*Schizachyrium scoparium*) (Poole and Riskind 1987).

Navasota ladies'-tresses are extremely slow-growing and long-lived, and individual plants depend on a symbiotic relationship with soil mycorhizal fungi that is established before the seed germinates. The seeds are microscopic and lack endosperm, so they depend on the fungi and appropriate soil moisture conditions to germinate and the species does not maintain any appreciable soil seed bank. Seeds may be dispersed by wind, and specific pollinator species have not been identified (Service 1984).

Rosette leaves support the formation of storage tubers between November and March that sequester resources in preparation for sending up a leafless bloom stalk at some future time. It is believed that plants often require more than one year of photosynthate storage to successfully send up a bloom stalk. Blooming is strongly dependent on adequate moisture the previous April/May and again in August/September (Wilson 1993, Service l984). If weather conditions have not been favorable for forming sufficient below-ground reserves, the plant may not bloom (Wilson l993). Vegetatively, Navasota ladies'-tresses plants are very hard to discern in their habitat, and therefore, surveys are not recommended except during the blooming season. In addition, this species looks very similar to two other common orchid species that can occur in the same area, *S. cernua* and *S. gracilis* var. *gracilis*. Positive identification can only be made during its flowering period.

Population Dynamics:

Pavlik (1996) proposed a method for estimating minimum population sizes needed for viable plant populations by evaluating nine important biological characteristics of the species of interest. Evaluating Navasota ladies'-tresses using this system, the biological characteristics

would rank as needing moderate to high population sizes for three of the factors considered, moderate population sizes for three other factors, and low population sizes based on only two of the characters. Ranking the factors on a six point scale from low population size (50) to high population size (2,500), Texas Parks and Wildlife Department botanists and the Service estimated that viable populations for this species may be in the range of 1,000 mature individuals. However, few known population areas approach this number of individuals even when factoring in the plants that are likely present but not blooming. Because of the low numbers of reported individuals, the slow growing nature of the plants, their unusual habitat requirements, and their sensitivity to disturbance and transplanting attempts, the species is not regarded as being very resilient, and, following any disturbance to a population, recovery is expected to be very slow.

Status and Distribution:

Navasota ladies'-tresses occur in Brazos, Burleson, Fayette, Freestone, Grimes, Jasper, Leon, Madison, Milam, Robertson, and Washington counties (Texas Biological Conservation Data System (TxBCD) 2001). Currently, approximately 139 sites have been recorded, representing probably 70-80 distinct population areas predominantly concentrated around southern Brazos County and central Grimes County. Up to 25 percent of the 139 recorded sites, however, are known to have been damaged or destroyed since they were first reported. In fact, over 75 percent of the recorded observations of Navasota ladies'-tresses are either over 10 years old, represent extirpated populations, or are lacking adequate survey information. In addition, in the majority of population areas, fewer than 25 plants were recorded, although not all individuals in a population are necessarily visible above ground in a given year and many of these sites have been visited only once (TxBCD 2001).

The primary threat to Navasota ladies'-tresses is destruction or modification of habitat from urbanization, clearing for agricultural production, or mining (47 FR 19539, Service 1984). Destruction of understory by feral pigs (*Sus scrofa*) is also a problem in some areas. Post oak savannah in many of these counties continues to be converted to bermuda grass (*Cynodon dactylon*) pasture. Subsequently, habitat loss continues, particularly in the areas of Brazos and Grimes counties where most sites are located. In addition, the City of College Station in Brazos County is growing rapidly, particularly in the southern and southeastern fringes where most known Navasota ladies'-tresses populations occur.

Navasota ladies'-tresses apparently do not transplant well. In a mining project in Grimes County by Texas Municipal Power Association (TMPA), plants in the impact area were removed and transplanted into an adjacent habitat area. Plant survival has been low at most sites (TMPA l996). Similarly, in an experiment in Lick Creek Park near College Station, Dr. Hugh Wilson planted some seedlings which survived into their second season, but died prior to the third growing season (Wilson l993).

The following summarizes the occurrence information for the eleven counties in which Navasota ladies'-tresses are present (all information is from the TxBCD 2001 unless otherwise noted).

Brazos and Grimes counties: Of the 139 total known Navasota ladies'-tresses occurrences, 85 percent were recorded from locations in either Brazos or Grimes counties. Twenty-nine have been reported from Brazos County alone and occur mostly in the southern and central portions of the county. Seven of the twenty-nine recorded observations, however, occur in the northeast corner of the county.

Eleven of the reported occurrences of Navasota ladies'-tresses in Brazos County were recorded without any survey data. Of the remaining eighteen records, four records provide only the years Navasota ladies'-tresses were observed (1946, 1979, 1982, and 1986) and another four records merely report that Navasota ladies'-tresses were documented in 1986. A survey from 1987 reported an occurrence of a large population scattered over the surveyed area and seven additional records report occurrences of 16, 45, 1,000, 38, 112, 76, and 6 plants from surveys conducted in 1993. In 1995, a survey reported an occurrence of 56 plants. In 2000, the most recently documented occurrence of Navasota ladies'-tresses in Brazos County, 48 plants in three subpopulations were found. Two of these three subpopulations were destroyed for a residential subdivision and the third was preserved in a conservation easement. Surveys conducted in 2003 found over 140 plants. The occurrence record documenting 1,000 plants comes from an eight-acre (three-hectare) site permanently protected by TxDOT as a result of a section 7 consultation on SH 6 south of College Station. However, no plants have been found in recent surveys.

Eighty-eight occurrences of Navasota ladies'-tresses have been reported from Grimes County. Of these 88, 78 occur on or near the TMPA's Gibbons Creek Station lignite mine or land monitored by TMPA. Of the 10 sites not recorded on TMPA land, three occur at Alum Creek, just northwest of the mine, and one occurs in the northwest corner of the county at Democrat Crossing. The Alum Creek sites had three, three, and nine plants, respectively, in a 1984 survey and the Democrat Crossing site had five plants in a 1983 survey. Two of the Alum Creek sites were resurveyed in 2001 and found to be part of a larger population of 774 plants. The six other sites not monitored by TMPA occur mostly within close proximity to the TMPA property. Four were surveyed in 1983, however, no plant numbers were recorded. The two other sites were surveyed in 1986 and 1989 with plant numbers recorded as "a few plants," and one plant, respectively.

As a result of earlier mining activities, twenty-eight of the known occurrences on the mine site were extirpated. Those plants that were not destroyed by the mining were transplanted and TMPA agreed, through earlier section 7 consultations on mining activities, to protect five sites for the life of the mine. These sites encompass about 175 acres (71 hectares) and the numbers of Navasota ladies'-tresses on the five sites range from a high of 955 plants in 1995 to a low of 36 plants in 1996. Surveys in 2000 found 17 plants with one site not surveyed. These numbers include both transplanted plants and those originally found on these sites. The majority of the remaining sites were surveyed one year each between 1984 and 1994 with plant numbers ranging from 1 to 83 on each site. Several sites were surveyed two or more years but plant numbers did not vary significantly.

Burleson County: Two occurrences of Navasota ladies'-tresses have been recorded. One occurrence was reported to have 80 plants in 1983 and 25 in 1986. The other record represents a population of 73 plants that were transplanted to the area in 1986. While eight plants were observed at this site in 1987, none were found in 1988, 1991, or 1997 surveys.

Fayette County: The only known location of Navasota ladies'-tresses was documented in a 1994 transmission line survey and has not been documented since. One flowering Navasota ladies'-tresses and three flowers that were intermediate between S. parksii and S. cernua were present. This record represents the southernmost occurrence of Navasota ladies'-tresses.

Freestone County: Navasota ladies'-tresses found in this county represent the northernmost extent of the known range for this species. TxBCD documents one occurrence of 28 plants that was observed in Freestone County in 1991. Survey data from the Jewett Mine indicates that three subpopulations of Navasota ladies'-tresses were found within the mine. However, all remaining populations in Freestone County not extirpated during the earlier mining activities will be extirpated as a result of the proposed mining operations in the Permit 47 Area of the Jewett Mine (Consultation # 2-15-02-F-0214).

Jasper County: Two occurrences of Navasota ladies'-tresses have been recorded. One of these records represents two plants observed in 1996, while the other represents one flowering plant and six sterile plants observed in 1997 (Jason Singhurst, TPWD, pers. comm.)

Leon County: One occurrence of 13 Navasota ladies'-tresses was reported in 1987. An additional record was reported in 1986, although this occurrence is questionable.

Madison County: Two records have been reported from the south-central portion of this county. One of these occurrences was reported in 1987, but survey data is lacking for both of these sightings.

Milam County: Two recorded occurrences of Navasota ladies'-tresses exist in this county. There were three plants observed at both of these locations, and these occurrences may be the same site (Kathy Parker, Tejas Environmental Services, pers. comm.). There are no records of subsequent surveys for Navasota ladies'-tresses. In addition, 2003 surveys for an electric transmission line identified an additional population approximately 10 miles (16 kilometers) east of the proposed project site. This population is not listed in the TxBCD and has not been confirmed by a species expert.

Robertson County: Seven occurrences of Navasota ladies'-tresses have been reported, however, survey data were not available for three of these records. Of the other four records, one occurrence was reported as three plants found in a 1983 survey, another was recorded as three plants from a 1997 survey, a third was recorded as one plant from a 1997 survey, and one was recorded as two subpopulations containing a total of 11 plants from a 1997 survey.

Washington County: Two sightings of Navasota ladies'-tresses have been recorded, however, one of these records has no survey data associated with it, and the other is probably gone because it represents a population of 19 plants that were transplanted to the area in 1986. Two plants were observed at the transplant site in 1988 and none were found in surveys conducted in 1991 and 1999.

Overall, the status of the Navasota ladies'-tresses is largely unknown. There is concern because some of the largest and most densely populated sites are being destroyed due to development and agriculture. Anecdotal evidence seems to support the theory that this species is more abundant than once thought; however, additional research and surveys are needed.

Analysis of the species likely to be affected:

The proposed project would not impact any known Navasota ladies'-tresses, but it would impact 103.53 acres (41.90 hectares) of habitat that may occur within the range of this species. Thirteen sites, which are considered marginal quality for habitat that may occur onsite, total 93.96 acres (38 hectares) and three sites, which are considered optimal quality for habitat, total 9.57 acres (3.87 hectares) within the project area. The action area is located in Milam County, a considerable distance from the "heart of the range" of Navasota ladies'-tresses in Brazos and Grimes counties, where 85 percent of the known occurrences are located. If the species is found to be present in the action area, it would be the westernmost occurrence of Navasota ladies'-tresses recorded.

Drought conditions prevalent in east-central Texas from 1997 through 2002 have hampered attempts to find Navasota ladies'-tresses, since low moisture conditions prevent the plants from producing flowering stalks in the fall. Consequently, in order to move the project forward despite Navasota ladies'-tresses presence not being confirmed by positive identification within the ROW, TxDOT assumes that suitable habitat within the proposed project area contains Navasota ladies'-tresses and will avoid and minimize impacts to this habitat to the extent possible.

Environmental Baseline

The action area for this project includes the proposed roadway, the ROW, and up to 100 feet (30 meters) outside the ROW to account for edge effects. Also included in the action area are the streams and drainages within the aforementioned area. Portions of these streams further than 100 feet downstream of the ROW are not included in the action area, because erosion and sedimentation are anticipated to be minimized by best construction management practices per the Texas Commission on Environmental Quality and the U.S. Army Corps of Engineers guidance.

Status of the species within the action area:

The Service considers the action area to be the area within the ROW and an additional 100 feet (30 meters) on either side to account for edge effects. Although the status of Navasota ladies'-

tresses is unknown because no individuals have been identified within the action area, records show the nearest population of Navasota ladies'-tresses has been found approximately 10 miles (16 kilometers) east of the proposed project eastern termini, although this population has not been confirmed by a species expert. Currently, this population represents the western extent of the known range of the Navasota ladies'-tresses. Two occurrences are known from Milam County (TxBCD 2001), and these lie approximately 15 miles (24 kilometers) east of the project area.

It is unclear if the 2002 blooming season survey performed by Blanton and Associates and the 2003 survey performed by TxDOT biologists were adequate to determine absence, as Navasota ladies'-tresses blooming is known to be highly variable based on climatic conditions throughout the year, and this species may remain dormant during dry years. From 1997 to 2002, drought conditions were prevalent across this species' range, including Milam County. Although rainfall levels have rebounded in recent years, it is still possible individual Navasota ladies'-tresses may be present but not blooming. Therefore, TxDOT chose to delineate habitat in the project area, assume the habitat is occupied, and that the species may be adversely affected.

Of the approximately 600 acres of new acquisition, 109.5 acres (44.3 hectares) are woodlands, defined as areas with approximately greater than 50 percent aerial coverage of tree canopy. Approximately 80 acres (32 hectares) are characterized as mature post oak woodlands, 18 acres (7 hectares) as degraded post oak woodlands, and 11 acres (5 hectares) as blackland prairie riparian woodlands. Impacts to large, contiguous tracts of the mature post oak woodlands are minor, because the alignment generally lies on the periphery of these tracts.

TxDOT identified 9.57 acres of habitat within the proposed ROW that are considered to be optimal for supporting Navasota ladies'-tresses. Habitat suitability was judged by soil texture, appropriate vegetative cover, canopy density, proximity to drainages, land use practices, and severity of grazing pressure. Areas were judged to have good potential if they had (1) permeable surface soils overlaying an impermeable clay layer, (2) post oak woodlands with sparse canopies or woodland edges, and (3) a significant component of native herbaceous vegetation. Proximity to small drainages and eroded gullies was considered to be a positive factor. Areas with minimal deviance from these characteristics were also considered to have a good likelihood to be habitat.

TxDOT also identified 93.96 acres of habitat that had the necessary soil and vegetative contexts to support Navasota ladies'-tresses but had been impacted by human activities such as grazing, quarrying, farming, private road construction, home building, and other land use practices. These areas were considered somewhat less likely to support extant populations of Navasota ladies'-tresses and thus were designated marginal habitat.

Factors affecting species environment within the action area:

Navasota ladies'-tresses habitat often occurs along margins in post oak woodlands in soils that are moderately to well-drained and have a loamy fine sand or fine sandy loam topsoil over a claypan subsoil. The project is located in the Post Oak Woods, Forest, and Grassland Mosaic

vegetational area of Texas. The natural vegetation is characterized by a mosaic of upland and dense post oak woodland interspersed with open, grassy savanna (McMahan, Frye, and Brown, 1984). The dominant tree species are post oak and blackjack oak. The dominant understory plant is yaupon with occasional farkleberry (*Vaccinium arboreum*) and roughleaf dogwood (*Cornus drummondii*). Wooded areas have canopies of 50-70 percent and tree height ranges between 30-45 feet (9.1-13.7 meters). The riparian forests contain stands of river birch (*Betula nigra*), elm (*Ulmus* spp.), and hackberry (*Celtis laevigata*). The grasslands along the project area contain a mixture of native and introduced grasses which are regularly mowed and maintained. The soils associated with these grasslands are characterized by a very hard, very fine sandy loam surface over a mottled yellow and gray, strongly acid, clayey subsoil.

The majority of the woodlands inside the ROW acquisition area are classified as mature post oak woodlands. Dominant tree species in these woodlands include black willow (*Salix nigra*), water oak (*Quercus nigra*), hackberry, and elm. The acquisition area also includes degraded post oak woodlands, which are characterized by similar tree species, but with a higher frequency of larger class yaupon. The westernmost portion of the area contains blackland prairie riparian woodlands, which includes American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), and sugarberry. Soil types present in approximately 90 percent of the project area include Edge, Padin, Crocket, Rader, and Silstead. The remaining 10 percent of the soils consist of Wilson, Uhland, and Minerva series. The surrounding topography is gently sloping to nearly level.

Currently, the land use in the project area is entirely rural and primarily agriculturally based, with 80 percent characterized as pastureland, 15 percent as woodlands, and 5 percent as residential and other uses. Two businesses, a hunting dog training facility and a stockyard and feed store, occur within the project boundaries. Within the proposed acquisition area, approximately 382 acres (155 hectares) is pasture used for cattle grazing. Navasota ladies'-tresses are anticipated to be restricted to those areas near intermittent drainages with associated woodland vegetation. The species is generally not found in cleared pasture or maintained residential or business sites.

The human population of Milam County is projected to grow from an estimated 24,510 in 2000 to 28,409 in 2020 (TWDB 2002). Most of the development anticipated for this area consists of low-density, rural residential development outside of the Rockdale extra-territorial jurisdiction (Sue Jones, Rockdale City Manager, pers. comm.). Human immigration into the county is expected to increase as the Austin and Bryan/College Station metropolitan areas continue to expand and transportation facilities are upgraded to facilitate the rising number of commuters through these areas.

Effects of the Action

According to the EA, the project will eliminate 103.53 acres (41.90 hectares) of Navasota ladies'-tresses habitat in sixteen separate areas. In addition, the proposed project will continue to add to the gradual sustained loss of post oak woodland in the area and to Navasota ladies'-tresses

habitat fragmentation. These impacts are likely permanent for Navasota ladies'-tresses due to changes in native vegetation and subsurface hydrology.

Further habitat degradation may be caused by secondary effects associated with increased industrialization and rapid urban growth resulting from economic stimulation (Service 1979). However, these effects are expected to be minimal as development along the relief route is not anticipated, because of the lack of a frontage road and entrances and exits at each of the two end points. Exits and entrances are only planned for the intersections of Farm-to-Market (F.M.) Road 908, F.M. 487, and U.S. 77. No residential or business driveways would lead directly onto the relief route. In addition, signage would be placed at both ends directing motorists to the existing U.S. 79 for access to food, lodging, and other businesses.

TxDOT's proposal to contribute to a conservation fund will likely have a future beneficial effect on the species, regionally, as lands are purchased or protected from alteration through use of these funds.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Destruction of habitat that may occur as a result of the proposed activity was evaluated. Other more indirect cumulative effects are largely unquantifiable. However, the following examination of activities and trends in the area documents an expected overall increase in activities that result in habitat loss, fragmentation, and degradation.

The primary threat to Navasota ladies'-tresses throughout its range is destruction or modification of habitat from urbanization, clearing for agricultural production, or mining (47 FR 19539, Service 1995 and 1984b). Destruction of woodland understory by feral hogs is also a problem in some areas. Almost 30 known sites have been lost in the last ten years to lignite mining. The only major mining operation in Milam County is the Sandow Mine, whose northern boundary is located approximately three miles (five kilometers) south of the eastern terminus of the proposed project. Many other sites are fragmented or otherwise impacted by urbanization. Subsequently, habitat loss continues, particularly in the areas of Brazos and Grimes counties where most sites are located.

Conclusion

After reviewing the current status of the Navasota ladies'-tresses, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued

existence of the Navasota ladies'-tresses. No critical habitat has been designated for the Navasota ladies'-tresses, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

As discussed above, sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act and the implementing regulations prohibit the removal and reduction to possession of federally listed threatened or endangered plants or the malicious damage of endangered plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

Amount or Extent of Take Anticipated

The Service does not anticipate the proposed action will incidentally take any listed animal species.

Effect of the Take

No take of any listed animal species is anticipated as a result of this proposed action.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to

help implement recovery plans, or to develop information. The Service recommends implementing the following actions:

I. Minimize the risk of destruction or harm to Navasota ladies'-tresses plants from direct application of herbicides, herbicide drift into adjacent areas, or through reduction in available pollinators. This would be accomplished by avoiding use of herbicides and pesticides in habitats which could potentially support Navasota ladies'-tresses, particularly in wooded areas of the ROW and during time periods when the Navasota ladies'-tresses are above ground. In addition, in areas where herbicide use cannot be avoided, direct application techniques should be used to minimize amount of application and the total area of impacted habitat.

II. Encourage and participate in additional Navasota ladies'-tresses research and recovery actions.

In order for the Austin Ecological Services field office to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

Reinitiation Notice

This concludes formal consultation on the construction of a U.S. 79 relief route around Rockdale, Texas. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this opinion, please contact Jana Milliken at (512) 490-0057, extension 243.

Sincerely,

/s/ Robert T. Pine

Robert T. Pine
Supervisor

cc: Karen Clary – TxDOT Environmental Affairs Division

LITERATURE CITED

Arft, A. and T. Ranker. l995. Demography of the rare orchid *Spiranthes diluvialis*: implications for conservation. Program and Abstracts, 9th annual meeting of the Society for Conservation Biology, June 7-11, Fort Collins, Colorado. Abstract, notes from presentation attended. Service files.

McMahon, C., R. Frye, and K. Brown. l984. The vegetation types of Texas, including cropland. Texas Parks and Wildlife Department. Austin, Texas.

Pavlik, B. l996. Defining and measuring success. In: Falk, D., C. Miller, and M. Olwell, eds. Restoring Diversity, Strategies for Reintroduction of Endangered Plants. Island Press, Washington, D.C.

Poole, J. and D. Riskind. l987. Endangered, threatened or protected native plants of Texas. Texas Parks and Wildlife Department, Austin, Texas.

Texas Biological Conservation Data System. 2001. Texas Parks and Wildlife Department. Special species and natural community data files and TxBCD data on USGS topographic maps.

Texas Municipal Power Agency. l996. A report on the 1995-1996 monitoring program for Navasota ladies'-tresses on the Gibbons Creek Lignite Mine in Grimes County, Texas. Texas Municipal Power Agency, Bryan, Texas.

Texas Plant Conservation Conference (TPCC). Proceedings from September 17-19, 2003. Lady Bird Johnson Wildlife Center, Austin, Texas.

Texas Water Development Board (TWDB). 2002 State Water Plan. "Population Projections by County."

U.S. Fish and Wildlife Service. l995. Threatened and Endangered Species of Texas (Revised). U.S. Fish and Wildlife Service, Austin, Texas.

U.S. Fish and Wildlife Service. l984. Navasota ladies'-tresses recovery plan. U.S. Fish and Wildlife Service, Endangered Species Office, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 1979. Unique Wildlife Ecosystems of Texas-Region 2. Albuquerque, New Mexico.

Wilson, H.D. l993. Contractor's partial draft of recovery plan revision for Navasota ladies'-tresses (unfinished contract). Service files.

Figure 1. U.S. 79 Relief Route around the City of Rockdale, Milam County, Texas